

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A laser beam altering optical device, comprising:

a mode controlling device for capturing a highly divergent, multi-mode laser beam received from a high-power broad area laser source, wherein the mode controlling device comprises an external optical reflector having a curved intensity profile promoting cavity for receiving the multi-mode laser beam, wherein the cavity comprises a focal length from the cavity surface, wherein the laser source is positioned at the focal distance from the cavity surface, and wherein a narrow, single-mode laser beam is produced by the mode controlling device; and

a frequency-altering device for receiving the single-mode laser beam, the frequency-altering device configured to produce a frequency-altered laser light.

2. The optical device of Claim 1, wherein the frequency-altered laser light has a wavelength approximate to 490 nm.

3. The optical device of Claim 1, wherein the frequency-altered laser light has a wavelength approximate to 532 nm.

4. The optical device of Claim 1, wherein the optical device further comprises a plano-convex lens having an optical diffractive element on a plano side of the plano-convex lens, the plano-convex lens and the optical diffractive element receive the narrow, single-mode laser beam and produce an output that is received by the frequency-altering device.

5. The optical device of Claim 4, wherein the optical diffractive element is a binary optical diffractive element.

6. The optical device of Claim 1, wherein the frequency-altering device comprises a ring resonator having a nonlinear crystal, wherein the ring resonator receives

the single-mode laser emitted from the mode controlling device, and configured to emit green laser light.

7. The optical device of Claim 1, wherein the frequency-altering device comprises a ring resonator having a nonlinear crystal, wherein the ring resonator receives the single-mode laser emitted from the mode controlling device, and emits blue laser light.

8. A laser beam altering optical device, comprising:  
a semiconductor laser having an active gain region with a beam emitting facet;  
an external optical reflector having a Gaussian intensity profile promoting cavity facing the facet of the semiconductor laser, the cavity having a focal length at a preselected distance from the cavity surface, the semiconductor laser positioned such that the facet is at the focal length distance from the cavity surface, wherein a laser beam with a substantially Gaussian intensity is produced; and  
a frequency-altering device for receiving the laser beam with the substantially Gaussian intensity, the frequency-altering device produces a frequency-altered laser light.

9. The optical device of Claim 8, wherein the external optical reflector produces a laser beam having a super-Gaussian intensity profile, wherein the laser beam having the super-Gaussian intensity profile is directed to and received by the frequency-altering device.

10. The optical device of Claim 8, wherein the external optical reflector produces a laser beam having a near-Gaussian intensity profile, wherein the laser beam having the near-Gaussian intensity profile is directed to and received by the frequency-altering device.

11. The optical device of Claim 8, wherein the frequency-altered laser light has a wavelength approximate to 490 nm.

12. The optical device of Claim 8, wherein the frequency-altered laser light has a wavelength approximate to 532 nm.

13. The optical device of Claim 8, wherein the frequency-altering device comprises a ring resonator having a nonlinear crystal, wherein the ring resonator receives the beam with the substantially Gaussian intensity, and configured to emit green laser light.

14. The optical device of Claim 8, wherein the frequency-altering device comprises a ring resonator having a nonlinear crystal, wherein the ring resonator receives the beam with the substantially Gaussian intensity, and configured to emit blue laser light.

15. The optical device of Claim 8, wherein the semiconductor laser emits an infrared laser.